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AUTHOR Dalton, David W.; Watson, James F.
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ABSTRACT

This study examined the effects of a year-long word processing program on learners' holistic writing skills. Based on results of a writing pretest, 80 seventh grade students were designated as relatively high or low in prior writing achievement and assigned to one of two groups: a word processing treatment and a conventional writing process treatment. Students in each treatment produced two weekly writing assignments and four major papers over the course of one year. At the conclusion of the study, each was given a standardized writing test which was evaluated for structure and organization, correct use of the parts of speech, punctuation, capitalization, and spelling. Analysis consisted of a 2X2 completely crossed treatment by achievement factorial design, featuring two levels of treatment and two levels of prior achievement. Results indicate that relatively low achieving learners scored significantly better when using the word processing treatment than low learners in the conventional treatment; however, word processing was not effective for the relatively high ability students. Lack of this efficacy is attributable to two reported factors: difficulty in keyboarding and problems in accessing the microcomputers. Future research on keyboarding skills, varied hardware configurations, and pre-writing and editing activities are suggested. A list of references, two data tables, and two figures are provided. (JB)

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WORD PROCESSING AND THE WRITING PROCESS: ENHANCEMENT OR DISTRACTION?

by

David W. Dalton
Instructional Systems Technology
School of Education
Indiana University
Bloomington, Indiana
and
James F. Watson
School of Education
University of Colorado
Denver, Colorado

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RUNNING HEAD: Word processing

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Abstract

Although highly-designed, outcome-based computer-based instructional interventions have been successful in inproving the basic skills of learners in a wide variety of educational settings, little research has been conducted on more open-ended computer learning activities, such as word processing.

The present study examined the effects of a year-long word processing program on learners' hollistic writing skills. Learners were in the treatment group used a word processor three times per week to complete their writing assignments, while students in the control used conventional print-based writing techniques.

Results from this study suggest that word processing is especially effective for low ability students. However, there were several logistical problems related to access to the computers encountered during the study that may have prevented more dramatic results.

WORD PROCESSING AND THE WRITING PROCESS:

ENHANCEMENT OR DISTRACTION?

Introduction

Highly-designed, outcome-based computer-assisted instruction (CAI) has been effective in a wide variety of instructional settings (Kulik, 1983). Yet, it has been suggested that the great potential benefits of instructional applications of computer-based technologies lie in more open-ended computer activities such as word processing, where the computer is used more as a learning tool than as an electronic tutor (Dudley-Marling, 1985).

Traditionally, writing skills have been taught by two distinct approaches: the reductive approach and the hollistic approach (Hartwell, 1985). In the reductive approach, writing is taught by focusing on discrete, often isolated mechanical skills, including punctuation, syntactical rules, etc.

The hollistic approach concentrates attention on the process of writing and largely neglects instruction in specific mechanics, the assumption being that if learners concentrate on the meaning and the production of the text as a whole, the mechanical skills will follow. With this approach, learners are taught that the writing process consists of three distinct steps: pre-writing or planning, writing, and

most importantly, revision (see Figure 1). This approach to writing instruction is now the most popular (Moffet, 1968).

Insert Figure 1 about here.

There is evidence to support the efficacy of the hollistic approach to writing instruction. In a study comparing the two approaches, no significant differences were found in the writing quality between treatment groups, leading the authors to conclude that the reductive approach, while leading to better mechanical skills, does not improve the overall quality of the writing product (Meckel, 1963). In addition, it has been noted that the hollistic approach can be especially effective in improving the writing skills of low-achieving learners, since these students tend to get bogged-down with the form, rather than the substance of the text (Rose, 1983).

In a recent review of the literature comparing the two approaches to writing instruction, it was noted that some authors found that mechanical approaches can often have deliterious effects on the overall quality of students' writing (Hartwell, 1985).

To date, computers have been used to support writing mechanics through the use of drill and practice and tutorial CAI. The RSVP project conducted in the Miami/Dade County schools found that this type of computer instruction did improve the learners'

mechanical skills, but had no discernable impact on the overall quality of their writing products. The "Writing to Read" project sponsored by IBM (Blum & Furlong, 1983) has also supported this lack of efficacy of the reductive approach.

The potential benefits of word processing technology in assisting learners within the hollistic approach, especially in the revision portion of the process, seem somewhat obvious. Yet, very little empirical study has been conducted to date. A recent study conducted with elementary students reported that the inclusion of word processors in the writing program produced significant improvements in the attitudes of the learners (Willer, 1985) Specifically, it was noted that the learners involved in the study had favorable attitudes towards the revision process when accomplished on the microcomputer and spent more time in the revision process. In addition, favorable results have been reported when word processors have been used with primary age learners (Phenix & Hannan, 1985)

Although the potential of word processing in aiding the writing process seems great with elementary learners, many questions as to the efficacy of this technology with other populations remain.

This study examined the effects of a year-long hollistic writing program that used word processing technology to aide learners in revising their writing on learners' writing skills.

Methods

Subjects

The subjects of this study were 80 seventh grade students, drawn from four remedial language arts courses. Learners were placed in the remedial programs based on below-average sixth grade Comprehensive Test of Basic Skills (CTBS) scores and through the reccommendations of their sixth grade teachers. Although below-average in language skills, many of these learners possessed average to above-average skills in other content areas, such as mathematics and science.

Materials

Two treatments were employed: a word processing treatment and a conventional writing process treatment.

Word processing treatment. Over a period of one academic year, students in the word processing group completed all of their respective writing assignments on an Apple IIe microcomputer equipped with the FreeWriter word processsing program. The FreeWriter program is a moderately powerful public domain word processing program which possesses editing features including the abilities to find and replace errors, move text blocks, and format documents on screen. Each student was furnished with their own word processing and data diskettes and provided with aproximately three instructional periods of computer time per week.

The students were given two weekly writing exercises to

complete on the word processor. This exercises included developing fictional short stories, writing letters, and expository prose. These exercises typically required the learner to produce between one and two pages of text each. In addition to the writing exercises, the students completed four major written papers. The students were given a general topic and asked to produce a final printed document of between three and five pages.

Conventional writing program. Students in the conventional writing program used pen-and-paper methods to complete the same types of writing activities.

Procedure

Prior to the beginning of the study, the learners were designated as relatively high or low in prior writing achievement based on results of a writing pretest.

The learners were then assigned to their relative treatment groups were they completed

At the conclusion of the study, the learners were given a standardized writing test, which was scored by three independent, "blind" examiners. The evaluations of each of the three examiners was combined to form a combined score.

These writing samples were evaluated by each examiner on the following five criteria: structure and organization, correct usage of the parts speech, punctuation, capitalization, and spelling.

Experimental Design and Data Analysis

The design of this study was a 2 x 2 completely crossed treatment by achievement factorial design, featuring two levels of treatment (word processing and conventional writing), and two levels of prior achievement (high and low).

Posttest writing sample scores were analyzed with ANOVA procedures.

Results

The percent cell means for the writing sample are given in Table 1. Overall, the mean of the relatively high achieving learners was 77.56%, while the mean of the relatively low achieveing learners was 71.06%. These means were significantly different at the p = .01 level as shown in Table 2, the analysis of variance table for this result.

Insert Tables 1 and 2 about here.

The mean for the word processing group was 75.69%, while the mean of the conventional writing group was 72.94%. These means were not significantly different. However, there was a significant (p = .10) Achievement by Treatment Interaction. This interaction is depicted graphically in Figure 2.

Insert Figure 2 about here.

Discussion

There are two results from this study that warrant further discussion. First, there was a significant achievement by treatment interaction. This interaction indicates that the relatively low achieving learners scored significantly better if they used the word processing treatment than low learners in the conventional.

This result supports much of the previous research that suggests that the writing skills of low achieving learners and other special populations can be greatly benefited by word processing technology even though other types of "special" interventions have had little effect.

In addition, this result and observations made during the study support the notion that word processing can make the revision process more facile and less frustrating for these learners. Specifically, the teachers involved in this study noted that the learners using the word processor required less encouragement to revise drafts of their writing assignments and generally spent more time in the revision process than their counterparts using pencil and paper methods.

Interviews conducted with learners in this study suggest that the word processor made the writing process more pleasant because

correcting errors was simplified and the computer eliminated much of the physical discomfort with which many of these learners have associated the writing act.

However, it should be noted that there was no treatment main effect observed in this study. Specifically, word processing was not effective for the relatively high ability students. Observations conducted during the study and interviews conducted at the conclusion of the study indicate that this lack of efficacy was the result of two main factors.

First, many students had significant trouble in keyboarding. Learners at this age level have been exposed to little formal typing instruction. As a result, they spend an inordinately large amount of time "hunting" about the keyboard before the can "peck" a key. Many learners stated that they found this task excessively time consuming and distracting when compared with pencil and paper writing. In fact, several noted that typing problems effectively interrupted their concentration while writing.

The second major problem with the word processing treatment was the disruptive nature of the accessing the hardware necessary. In this school environment, all of the school's computers are grouped into two laboratories. Although ready access was not a problem during the period of time required for the study, each trip to the computer lab seemed to be a "mini field-trip."

Several students stated that they preferred remaining in class

working, rather than the disruption of relocating in the computer lab. In addition, other students said that they often purposefully wasted time during the required transitional periods.

Finally, several students in the word processing group noted that they often neglected the careful planning that they would have ordinarily performed prior to actually composing the draft. The attributed this neglect to their impression that the word processor simplified editing to such an extent that planning was no longer as important as it had been with conventional paper and pencil writing. One student noted that the consequences of poor planning while using the word processor were not a severe since "with computer, so what if you have to start over?"

Although this study demonstrated that word processing has the potential to provide an instructional environment that can be beneficial to the writing skills of low achieving learners, several important questions remain and further research should be conducted.

Future studies should investigate three issues concerning the instructional uses of word processing. First, an appropriate mode of providing basic keyboarding skills should be investigated. Perhaps an introductory module on keyboarding should be provided to all the students in a manner analguous to basic handwriting skills. Clearly, the lack of these skills is a serious impediment to developing writing skills with the word processor.

Second, varied hardware configurations should be examined in

order to find the basing mode in which the type of distractions observed in this study might be minimized. For example, potential solutions including using a dedicated computer classroom should be investigated. In any event, the disruptive arrangements encountered during this studied should be minimized to the extent possible.

Finally, future studies should determine ways in which outlining and other pre-writing activities can be emphasized, along with the re-writing and editing phases of the writing process. There are several relatively new computer-assisted project planning programs that are available. Perhaps such a package might provide a suitable method with which planning skills might be developed.

In summary, the results of this study suggest that, with the exception of several significant logistical problems associated with the implementation of the computers themselves, word processing technology, because of its ability to greatly simplify the re-writing phase, may provide the ideal medium for the development of hollistic writing skills for many learners.

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Table 1. Writing sample cell means in percent.

	Word Processing	Control	TOTAL
High	$\bar{X}$ = 77.13 s = 10.10 (n = 16)	$\bar{X}$ = 78.00 s = 8.85 (n = 16)	$\bar{X}$ = 77.56 s = 9.35 (n = 32)
Low	$\bar{X}$ = 74.25 s = 7.86 (n = 16)	$\bar{X}$ = 67.88 s = 7.71 (n = 16)	$\bar{X}$ = 71.06 s = 8.32 (n = 32)
TOTAL	$\bar{X}$ = 75.69 s = 9.02 (n = 32)	$\bar{X}$ = 72.94 s = 9.65 (n = 32)	$\bar{X}$ = 74.31 s = 9.37 (n = 64)

Table 2. Analysis of variance for the writing sample.

Source	SS	df	MS	F
Achievement (A)	676	1	676	8.96[a]
Treatment (T)	121	1	121	1.60
A x T	210.25	1	210.25	2.79[b]
Within (error)	4527.50	60	75.46	

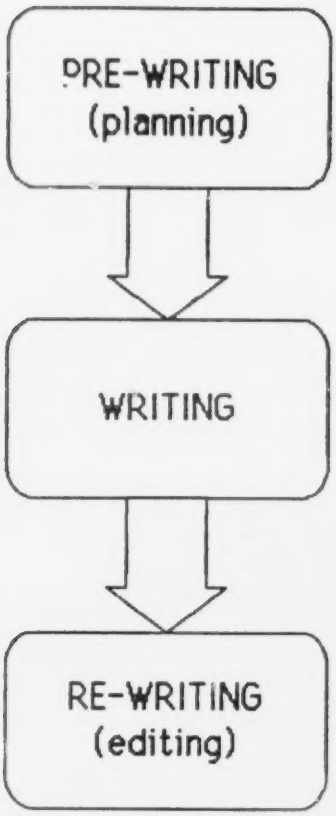
[a] $.001 < p < .01$

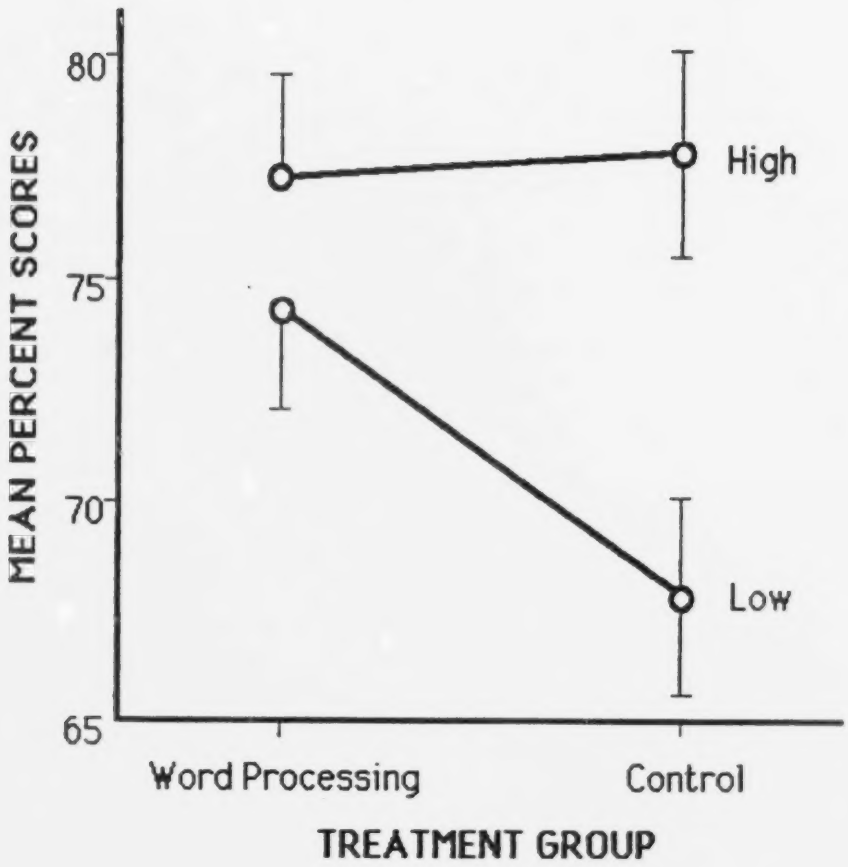
[b] $.05 < p < .10$

Figure Captions

Figure 1. The writing process including pre-writing, writing, and re-writing.

Figure 2. Achievement by Treatment Interaction for the writing sample.


PRE-WRITING
(planning)
WRITING
RE-WRITING
(editing)


80
75
70
65
MEAN PERCENT SCORES
High
Low
Word Processing
Control
TREATMENT GROUP